

**Patent Claims**

1. A heat exchanger having an in particular hydrophilic surface coating (2; 12), characterized in  
5 that the surface coating (2; 12) contains nanoparticles (3), coated nanoparticles and/or grafted nanoparticles (13) comprising or consisting of oxides.
2. The heat exchanger as claimed in claim 1,  
10 characterized in that oxides of the elements from main group II and/or main group III and/or oxides of germanium, tin, lead and/or oxides of the transition metals and/or oxides of zinc and/or oxides of cerium are provided.
3. The heat exchanger as claimed in claim 1 or 2,  
15 characterized in that the surface coating (12) contains nanoparticles, coated nanoparticles and/or grafted nanoparticles (13) comprising or consisting of hydrated oxides and/or nitrides and/or carbides.
4. The heat exchanger as claimed in claim 3,  
20 characterized in that the hydrated oxides, nitrides and carbides comprise elements from main group III and/or main group IV and/or transition metals and/or cerium.
5. The heat exchanger as claimed in claim 4,  
25 characterized in that a transition metal belongs to transition group IV and/or V or is zinc.
6. The heat exchanger as claimed in one of the  
30 preceding claims, characterized in that the nanoparticles (3), coated nanoparticles and/or grafted nanoparticles (13) are contained in an aqueous  
35 dispersion or solution, which contains a preferably organic binder, and/or in a dispersion or solution based on organic dispersants or solvents, which

contains a preferably organic binder, or in a sol, which is used as coating material in a sol-gel coating.

7. The heat exchanger as claimed in claim 6,  
5 characterized in that the sol contains alkoxy compounds of elements from main group III and/or of elements from main group IV and/or of transition metals.

8. The heat exchanger as claimed in claim 7,  
10 characterized in that the transition metals belong to transition group IV or V.

9. The heat exchanger as claimed in claim 8,  
15 characterized in that in the alkoxy compounds some of the hydrolysable alkoxy radicals are substituted by alkyl and/or aryl radicals, or in that a mixture of pure alkoxy compounds and alkoxy compounds which partly contain alkyl and/or aryl radicals is provided.

20 10. The heat exchanger as claimed in one of the preceding claims, characterized in that the nanoparticles (3), coated nanoparticles and/or grafted nanoparticles (13) have a mean diameter of from 1 to 1000 nm.

25 11. The heat exchanger as claimed in one of the preceding claims, characterized in that the surface coating (2; 12) includes constituents with an antimicrobial action.

30 12. A process for coating a heat exchanger with an in particular hydrophilic surface coating, a surface coating (2; 12) which contains nanoparticles (3), coated nanoparticles and/or grafted nanoparticles (13)  
35 as set forth in one of the preceding claims being applied.

13. The process for coating a heat exchanger as claimed in claim 12, characterized in that the surface coating (2; 12) is applied by means of dipping, flooding and/or spraying.

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14. The process for coating a heat exchanger as claimed in one of claims 12 to 13, characterized in that a pre-treatment by means of an acidic or alkaline pickle is carried out, with subsequent scale removal and/or a conversion treatment.

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15. The process for coating a heat exchanger as claimed in claim 14, characterized in that mixed oxides and/or mixed fluorides are formed during the conversion treatment.

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16. The process for coating a heat exchanger as claimed in one of claims 12 to 15, characterized in that a drying process is carried out after a pre-treatment by means of an acidic or alkaline pickle with subsequent scale removal and/or a conversion treatment.

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17. The process for coating a heat exchanger as claimed in one of claims 12 to 16, characterized in that the operation of applying the surface coating (2; 12) is followed by a drying operation.

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